☐ 1: Prog Cell Cycle Res 2000;4:83-96

Phosphorylation-dependent prolyl isomerization: a novel cell cycle regulatory mechanism.

Lu KP.

Department of Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, USA.

Protein phosphorylation by proline-directed protein kinases plays an essential role in triggering a programmed set of cell cycle events. We have recently isolated an essential and conserved mitotic regulator, Pin1. Pin1 is a phosphorylation-dependent prolyl isomerase that specifically isomerizes the phosphorylated serine/threonine-proline bond. Pin1 also binds and regulates the function of a conserved set of mitosis-specific phosphoproteins. These results suggest phosphorylation-dependent prolyl isomerization to be a novel cell cycle regulatory mechanism. This new post-translational regulation may allow the general increase in protein phosphorylation to be converted into the organised and programmed set of structural modifications that occur during mitosis. In addition, since inhibition of Pin1 induces mitotic arrest and apoptosis, Pin1 may be a potential new drug target.

Publication Types:
- Review
- Review, Academic

PMID: 10740817 [PubMed - indexed for MEDLINE]

1: Science 1998 Feb 27;279(5355):1287 Related Articles, NEW Books, LinkOut

Comment on:

- Science. 1997 Dec 12;278(5345):1883-4.

Pinning down cell division?

Miklos GL, Hanes SD, Maleszka R.

Publication Types:

- Comment
- Letter

PMID: 9508696 [PubMed - indexed for MEDLINE]

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☐ **1:** Science 1997 Dec 12;278(5345):1883-4 Related Articles, NEW **Books**, LinkOut

Comment in:
- Science. 1998 Feb 27;279(5355):1287.

Comment on:
- Science. 1997 Dec 12;278(5345):1957-60.

Pinning down cell division.

Vogel G.

Publication Types:
- Comment
- News

PMID: 9417635 [PubMed - indexed for MEDLINE]

☐ 1: Cell 1997 Jun 13;89(6):875-86

Structural and functional analysis of the mitotic rotamase Pin1 suggests substrate recognition is phosphorylation dependent.

Ranganathan R, Lu KP, Hunter T, Noel JP.

Structural Biology Laboratory, The Salk Institute for Biological Studies, La Jolla, California 92037, USA.

The human rotamase or peptidyl-prolyl cis-trans isomerase Pin1 is a conserved mitotic regulator essential for the G2/M transition of the eukaryotic cell cycle. We report the 1.35 A crystal structure of Pin1 complexed with an AlaPro dipeptide and the initial characterization of Pin1's functional properties. The crystallographic structure as well as pH titration studies and mutagenesis of an active site cysteine suggest a catalytic mechanism that includes general acid-base and covalent catalysis during peptide bond isomerization. Pin1 displays a preference for an acidic residue N-terminal to the isomerized proline bond due to interaction of this acidic side chain with a basic cluster. This raises the possibility of phosphorylation-mediated control of Pin1-substrate interactions in cell cycle regulation.

PMID: 9200606 [PubMed - indexed for MEDLINE]

FILE 'MEDLINE, CAPLUS, CANCERLIT, EMBASE, BIOSIS, USPATFULL' ENTERED AT 10:25:57 ON 20 MAR 2002

L1 1238 S PIN1 OR PEPTIDYL-PROLYL ISOMERASE
L2 1986575 S CANCER
L3 80 S L1 AND L2
L4 13 S L3 NOT PY=>1998
L5 4 DUP REM L4 (9 DUPLICATES REMOVED)
L6 456 S PIN1
L7 42 S L6 AND L2
L8 9 S L7 NOT PY=>1998

=> d l7 1-42

L7 ANSWER 1 OF 42 MEDLINE
AN 2002059733 IN-PROCESS
DN 21646353 PubMed ID: 11787050
TI IGF-1 induces **Pin1** expression in promoting cell cycle S-phase entry.
AU You Han; Zheng Hongwu; Murray Steven A; Yu Qiang; Uchida Takafumi; Fan Daiming; Xiao Zhi-Xiong Jim
CS Department of Biochemistry, Boston University School of Medicine, Boston, Massachusetts, 02118.
SO JOURNAL OF CELLULAR BIOCHEMISTRY, (2002) 84 (2) 211-6.
Journal code: 8205768. ISSN: 0730-2312.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS IN-PROCESS; NONINDEXED; Priority Journals
ED Entered STN: 20020125
Last Updated on STN: 20020125

L7 ANSWER 2 OF 42 MEDLINE
AN 2002049146 IN-PROCESS
DN 21635614 PubMed ID: 11774038
TI Microtubule-targeting drugs induce bcl-2 phosphorylation and association with **pin1**.
AU Pathan N; Aime-Sempe C; Kitada S; Basu A; Haldar S; Reed J C
CS The Burnham Institute, 10901 N. Torrey Pines Rd., La Jolla, CA 92037, USA.
SO NEOPLASIA, (2001 Nov-Dec) 3 (6) 550-9.
Journal code: 100886622. ISSN: 1522-8002.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS IN-PROCESS; NONINDEXED; Priority Journals
ED Entered STN: 20020125
Last Updated on STN: 20020125

L7 ANSWER 3 OF 42 MEDLINE
AN 2001490950 MEDLINE
DN 21424742 PubMed ID: 11533658
TI **Pin1** regulates turnover and subcellular localization of beta-catenin by inhibiting its interaction with APC.
AU Ryo A; Nakamura M; Wulf G; Liou Y C; Lu K P
CS Cancer Biology Program, Division of Hematology/Oncology, Department of Medicine, Beth Israel Deaconess Medical Center, 330 Brookline Avenue, HIM 1047, Boston, MA 02215, USA.
SO NATURE CELL BIOLOGY, (2001 Sep) 3 (9) 793-801.
Journal code: DIQ; 100890575. ISSN: 1465-7392.
CY England: United Kingdom
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 200110
ED Entered STN: 20010905
Last Updated on STN: 20011022
Entered Medline: 20011018

L7 ANSWER 4 OF 42 MEDLINE
AN 2001412890 MEDLINE
DN 21325923 PubMed ID: 11432833
TI **Pin1** is overexpressed in breast **cancer** and cooperates with Ras signaling in increasing the transcriptional activity of c-Jun towards cyclin D1.
AU Wulf G M; Ryo A; Wulf G G; Lee S W; Niu T; Petkova V; Lu K P
CS Cancer Biology Program, Division of Hematology and Oncology, Department of Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02115, USA.
NC GM58556 (NIGMS)
R01GM56230 (NIGMS)
SO EMBO JOURNAL, (2001 Jul 2) 20 (13) 3459-72.
Journal code: EMB; 8208664. ISSN: 0261-4189.
CY England: United Kingdom
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 200108
ED Entered STN: 20010813
Last Updated on STN: 20010813
Entered Medline: 20010809

L7 ANSWER 5 OF 42 MEDLINE
AN 2001354426 MEDLINE
DN 21226029 PubMed ID: 11326318
TI Microtubule-targeting drugs induce Bcl-2 phosphorylation and association with **Pin1**.
AU Pathan N; Aime-Sempe C; Kitada S; Haldar S; Reed J C
CS The Burnham Institute, 10901 N. Torrey Pines, La Jolla, CA 92037, USA.
NC GM 60554 (NIGMS)
SO NEOPLASIA, (2001 Jan-Feb) 3 (1) 70-9.
Journal code: DRU; 100886622. ISSN: 1522-8002.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 200106
ED Entered STN: 20010625
Last Updated on STN: 20010625
Entered Medline: 20010621

L7 ANSWER 6 OF 42 MEDLINE
AN 2000112847 MEDLINE
DN 20112847 PubMed ID: 10644742
TI BRCA1 effects on the cell cycle and the DNA damage response are linked to altered gene expression.
AU MacLachlan T K; Somasundaram K; Sgagias M; Shifman Y; Muschel R J; Cowan K H; El-Deiry W S
CS Laboratory of Molecular Oncology, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania 19104, USA.
SO JOURNAL OF BIOLOGICAL CHEMISTRY, (2000 Jan 28) 275 (4) 2777-85.
Journal code: HIV; 2985121R. ISSN: 0021-9258.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 200002
ED Entered STN: 20000314
Last Updated on STN: 20000314
Entered Medline: 20000229

L7 ANSWER 7 OF 42 MEDLINE
AN 1998054283 MEDLINE
DN 98054283 PubMed ID: 9391075
TI Characterization and cell cycle regulation of the related human telomeric proteins Pin2 and TRF1 suggest a role in mitosis.
AU Shen M; Haggblom C; Vogt M; Hunter T; Lu K P
CS Cancer Biology Program, Division of Hematology/Oncology, Department of Medicine, Beth Israel Deaconess Medical Center, Boston, MA 02215, USA.
NC CA14195 (NCI)
CA39780 (NCI)
RR04050 (NCRR)
+
SO PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, (1997 Dec 9) 94 (25) 13618-23.
Journal code: PV3; 7505876. ISSN: 0027-8424.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 199801
ED Entered STN: 19980129
Last Updated on STN: 19980129
Entered Medline: 19980115

L7 ANSWER 8 OF 42 MEDLINE
AN 95335948 MEDLINE
DN 95335948 PubMed ID: 7611534
TI Interobserver reproducibility in the diagnosis of prostatic intraepithelial neoplasia.
AU Epstein J I; Grignon D J; Humphrey P A; McNeal J E; Sesterhenn I A; Troncoso P; Wheeler T M
CS Department of Pathology, Johns Hopkins Hospital, Baltimore, MD 21287-6971, USA.
SO AMERICAN JOURNAL OF SURGICAL PATHOLOGY, (1995 Aug) 19 (8) 873-86.
Journal code: 3YV; 7707904. ISSN: 0147-5185.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 199508
ED Entered STN: 19950828
Last Updated on STN: 19970203
Entered Medline: 19950815

L7 ANSWER 9 OF 42 CAPLUS COPYRIGHT 2002 ACS
AN 2002:51746 CAPLUS
DN 136:112609
TI Reagents and methods for identification of binding agents
IN Davies, Peter
PA Molecular Geriatrics Corporation, USA
SO PCT Int. Appl., 55 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2002004949	A2	20020117	WO 2001-US21859	20010711

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

PRAI US 2000-217604P P 20000711

L7 ANSWER 10 OF 42 CAPLUS COPYRIGHT 2002 ACS
AN 2002:45608 CAPLUS
TI Microtubule-targeting drugs induce Bcl-2 phosphorylation and association with **Pin1**
AU Pathan, Nuzhat; Aime-Sempe, Christine; Kitada, Shinichi; Basu, Aruna; Haldar, Subrata; Reed, John C.
CS The Burnham Institute, La Jolla, CA, 92037, USA
SO Neoplasia (New York, NY, United States) (2001), 3(6), 550-559
CODEN: NEOPFL; ISSN: 1522-8002
PB Nature Publishing Group
DT Journal
LA English
RE.CNT 57 THERE ARE 57 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 11 OF 42 CAPLUS COPYRIGHT 2002 ACS
AN 2001:763492 CAPLUS
DN 135:315574
TI Methods for the detection of modified peptides, proteins and other molecules
IN Volinia, Stefano
PA Italy
SO U.S. Pat. Appl. Publ., 36 pp.
CODEN: USXXCO
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2001031469	A1	20011018	US 2001-753114	20010102

PRAI US 2000-174171P P 20000103

L7 ANSWER 12 OF 42 CAPLUS COPYRIGHT 2002 ACS
AN 2001:699609 CAPLUS
DN 136:3865
TI **Pin1** regulates turnover and subcellular localization of .beta.-catenin by inhibiting its interaction with APC
AU Ryo, Akihide; Nakamura, Masafumi; Wulf, Gerburg; Liou, Yih-Cherng; Lu, Kun Ping
CS Cancer Biology Program, Division of Hematology/Oncology, Department of Medicine, Beth Israel Deaconess Medical Center, Boston, MA, 02215, USA
SO Nature Cell Biology (2001), 3(9), 793-801
CODEN: NCBIFN; ISSN: 1465-7392
PB Nature Publishing Group
DT Journal
LA English
RE.CNT 50 THERE ARE 50 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 13 OF 42 CAPLUS COPYRIGHT 2002 ACS
AN 2001:544352 CAPLUS
DN 135:255315
TI **Pin1** is overexpressed in breast **cancer** and cooperates with Ras signaling in increasing the transcriptional activity of c-Jun towards cyclin D1
AU Wulf, Gerburg M.; Ryo, Akihide; Wulf, Gerald G.; Lee, Sam W.; Niu, Tianhua; Petkova, Victoria; Lu, Kun Ping
CS Cancer Biology Program, Division of Hematology and Oncology, Beth Israel

Deaconess Medical Center, Harvard Medical School, Harvard School of Public Health, Boston, MA, 02115, USA
SO EMBO Journal (2001), 20(13), 3459-3472
CODEN: EMJODG; ISSN: 0261-4189
PB Oxford University Press
DT Journal
LA English
RE.CNT 59 THERE ARE 59 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 14 OF 42 CAPLUS COPYRIGHT 2002 ACS
AN 2001:397173 CAPLUS
DN 135:2549
TI **Pin1** as a marker for abnormal cell growth
IN Lu, Kun Ping; Wulf, Gerburg; Zhou, Xiao Zhen
PA Beth Israel Deaconess Medical Center, USA
SO PCT Int. Appl., 87 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001038878	A2	20010531	WO 2000-US32560	20001129
	WO 2001038878	A3	20020117		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	US 2002025521	A1	20020228	US 2000-726464	20001129
PRAI	US 1999-167800P	P	19991129		

L7 ANSWER 15 OF 42 CAPLUS COPYRIGHT 2002 ACS
AN 2001:262398 CAPLUS
DN 135:220736
TI Microtubule-targeting drugs induce Bcl-2 phosphorylation and association with **Pin1**
AU Pathan, Nuzhat; Aime-Sempe, Christine; Kitada, Shinichi; Haldar, Subrata; Reed, John C.
CS The Burnham Institute, La Jolla, CA, 92037, USA
SO Neoplasia (New York, NY, United States) (2001), 3(1), 70-79
CODEN: NEOPFL; ISSN: 1522-8002
PB Nature America Inc.
DT Journal
LA English
RE.CNT 57 THERE ARE 57 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 16 OF 42 CAPLUS COPYRIGHT 2002 ACS
AN 2000:99456 CAPLUS
DN 132:249303
TI BRCA1 effects on the cell cycle and the DNA damage response are linked to altered gene expression
AU MacLachlan, Timothy K.; Somasundaram, Kumaravel; Sgagias, Magda; Shifman, Yelena; Muschel, Ruth J.; Cowan, Kenneth H.; El-Deiry, Wafik S.
CS Laboratory of Molecular Oncology and Cell Cycle Regulation, the Howard Hughes Medical Institute, University of Pennsylvania School of Medicine, Philadelphia, PA, 19104, USA
SO J. Biol. Chem. (2000), 275(4), 2777-2785
CODEN: JBCHA3; ISSN: 0021-9258
PB American Society for Biochemistry and Molecular Biology
DT Journal
LA English
RE.CNT 52 THERE ARE 52 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 17 OF 42 CAPLUS COPYRIGHT 2002 ACS
AN 1997:802625 CAPLUS
DN 128:139095
TI Characterization and cell cycle regulation of the related human telomeric proteins Pin2 and TRF1 suggest a role in mitosis
AU Shen, Minhui; Haggblom, Candy; Vogt, Marguerite; Hunter, Tony; Lu, Kun Ping
CS Cancer Biol. Program, Div. Hematol./Oncol., Dep. Med., Beth Israel Deaconess Med. Cent., Div. Aging, Harvard med. Sch., Boston, MA, 02215, USA
SO Proceedings of the National Academy of Sciences of the United States of America (1997), 94(25), 13618-13623
CODEN: PNASA6; ISSN: 0027-8424
PB National Academy of Sciences
DT Journal
LA English

L7 ANSWER 18 OF 42 CANCERLIT
AN 2000112847 CANCERLIT
DN 20112847
TI BRCA1 effects on the cell cycle and the DNA damage response are linked to altered gene expression.
AU MacLachlan T K; Somasundaram K; Sgagias M; Shifman Y; Muschel R J; Cowan K H; El-Deiry W S
CS Laboratory of Molecular Oncology, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania 19104, USA.
SO JOURNAL OF BIOLOGICAL CHEMISTRY, (2000). Vol. 275, No. 4, pp. 2777-85.
Journal code: HIV. ISSN: 0021-9258.
DT Journal; Article; (JOURNAL ARTICLE)
FS MEDL; L; Priority Journals; Cancer Journals
LA English
OS MEDLINE 20112847
EM 200004

L7 ANSWER 19 OF 42 CANCERLIT
AN 1998054283 CANCERLIT
DN 98054283
TI Characterization and cell cycle regulation of the related human telomeric proteins Pin2 and TRF1 suggest a role in mitosis.
AU Shen M; Haggblom C; Vogt M; Hunter T; Lu K P
CS Cancer Biology Program, Division of Hematology/Oncology, Department of Medicine, Beth Israel Deaconess Medical Center, Boston, MA 02215, USA.
NC RR04050 (NCRR)
CA14195 (NCI)
CA39780 (NCI)
+
SO PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, (1997). Vol. 94, No. 25, pp. 13618-23.
Journal code: PV3. ISSN: 0027-8424.
DT Journal; Article; (JOURNAL ARTICLE)
FS MEDL; L; Priority Journals; Cancer Journals
LA English
OS MEDLINE 98054283
EM 199802

L7 ANSWER 20 OF 42 CANCERLIT
AN 95335948 CANCERLIT
DN 95335948

TI Interobserver reproducibility in the diagnosis of prostatic intraepithelial neoplasia.
AU Epstein J I; Grignon D J; Humphrey P A; McNeal J E; Sesterhenn I A; Troncoso P; Wheeler T M
CS Department of Pathology, Johns Hopkins Hospital, Baltimore, MD 21287-6971, USA.
SO AMERICAN JOURNAL OF SURGICAL PATHOLOGY, (1995). Vol. 19, No. 8, pp. 873-86.
Journal code: 3YV. ISSN: 0147-5185.
DT Journal; Article; (JOURNAL ARTICLE)
FS MEDL; L; Priority Journals; Cancer Journals
LA English
OS MEDLINE 95335948
EM 199509

L7 ANSWER 21 OF 42 EMBASE COPYRIGHT 2002 ELSEVIER SCI. B.V.
AN 2002014973 EMBASE
TI IGF-1 induces **Pin1** expression in promoting cell cycle S-phase entry.
AU You H.; Zheng H.; Murray S.A.; Yu Q.; Uchida T.; Fan D.; Xiao Z.-X.J.
CS Z.-X.J. Xiao, Boston University, School of Medicine, 88 East Newton Street, Boston, MA 02118, United States. jxiao@bu.edu
SO Journal of Cellular Biochemistry, (2001) 84/2 (211-216).
Refs: 21
ISSN: 0730-2312 CODEN: JCEBD5
CY United States
DT Journal; Article
FS 016 Cancer
029 Clinical Biochemistry
LA English
SL English

L7 ANSWER 22 OF 42 EMBASE COPYRIGHT 2002 ELSEVIER SCI. B.V.
AN 2001319021 EMBASE
TI **Pin1** regulates turnover and subcellular localization of .beta.-catenin by inhibiting its interaction with APC.
AU Ryo A.; Nakamura M.; Wulf G.; Liou Y.-C.; Lu K.P.
CS K.P. Lu, Cancer Biology Program, Division of Hematology/Oncology, Beth Israel Deaconess Medical Center, 330 Brookline Avenue, Boston, MA 02215, United States. klu@bidmc.harvard.edu
SO Nature Cell Biology, (2001) 3/9 (793-801).
Refs: 50
ISSN: 1465-7392 CODEN: NCBIFN
CY United Kingdom
DT Journal; Article
FS 016 Cancer
029 Clinical Biochemistry
LA English
SL English

L7 ANSWER 23 OF 42 EMBASE COPYRIGHT 2002 ELSEVIER SCI. B.V.
AN 2001245670 EMBASE
TI **Pin1** is overexpressed in breast **cancer** and cooperates with Ras signaling in increasing the transcriptional activity of c-Jun towards cyclin D1.
AU Wulf G.M.; Ryo A.; Wulf G.G.; Lee S.W.; Niu T.; Petkova V.; Kun Ping Lu
CS K.P. Lu, Cancer Biology Program, Division of Hematology, Harvard School of Public Health, Boston, MA 02115, United States. klu@caregroup.harvard.edu
SO EMBO Journal, (2 Jul 2001) 20/13 (3459-3472).
Refs: 59
ISSN: 0261-4189 CODEN: EMJODG
CY United Kingdom
DT Journal; Article
FS 005 General Pathology and Pathological Anatomy
016 Cancer
029 Clinical Biochemistry
LA English
SL English

L7 ANSWER 24 OF 42 EMBASE COPYRIGHT 2002 ELSEVIER SCI. B.V.
AN 2001094254 EMBASE
TI Microtubule-targeting drugs induce Bcl-2 phosphorylation and association with **Pin1**.
AU Pathan N.; Aime-Sempe C.; Kitada S.; Haldar S.; Reed J.C.
CS Dr. J.C. Reed, Burnham Institute, 10901 N. Torrey Pines, San Diego, CA 92037, United States. jreed@burnham.org
SO Neoplasia, (2001) 3/1 (70-79).
Refs: 57
ISSN: 1522-8002 CODEN: NEOPFL
CY United States
DT Journal; Article
FS 016 Cancer
037 Drug Literature Index
LA English
SL English

L7 ANSWER 25 OF 42 EMBASE COPYRIGHT 2002 ELSEVIER SCI. B.V.
AN 1998004876 EMBASE
TI Characterization and cell cycle regulation of the related human telomeric proteins Pin2 and TRF1 suggest a role in mitosis.
AU Shen M.; Haggblom C.; Vogt M.; Hunter T.; Kun Ping Lu
CS K.P. Lu, Harvard Institutes of Medicine, HIM 1047, 330 Brookline Avenue, Boston, MA 02215, United States. klu@bidmc.harvard.edu
SO Proceedings of the National Academy of Sciences of the United States of America, (1997) 94/25 (13618-13623).
Refs: 40
ISSN: 0027-8424 CODEN: PNASA6
CY United States
DT Journal; Article
FS 029 Clinical Biochemistry
LA English
SL English

L7 ANSWER 26 OF 42 EMBASE COPYRIGHT 2002 ELSEVIER SCI. B.V.
AN 96376614 EMBASE
DN 1996376614
TI Differential histochemical peanut agglutinin stain in benign and malignant human prostate tumors: Relationship with prostatic specific antigen immunostain and nuclear DNA content.
AU Janssen T.; Petein M.; Van Velthoven R.; Van Leer P.; Fourmarier M.; Vanegas J.-P.; Danguy A.; Schulman C.; Pasteels J.-L.; Kiss R.
CS Laboratory of Histology, Faculty of Medicine, Universite Libre de Bruxelles, 808, route de Lennik,1070 Brussels, Belgium
SO Human Pathology, (1996) 27/12 (1341-1347).
ISSN: 0046-8177 CODEN: HPCQA4
CY United States
DT Journal; Article
FS 005 General Pathology and Pathological Anatomy
028 Urology and Nephrology
LA English
SL English

L7 ANSWER 27 OF 42 EMBASE COPYRIGHT 2002 ELSEVIER SCI. B.V.
AN 95229674 EMBASE
DN 1995229674
TI Interobserver reproducibility in the diagnosis of prostatic intraepithelial neoplasia.
AU Epstein J.I.; Grignon D.J.; Humphrey P.A.; McNeal J.E.; Sesterhenn I.A.;

Troncoso P.; Wheeler T.M.
CS Department of Pathology, Johns Hopkins Hospital, 600 N. Wolfe Street,Baltimore, MD 21287-6971, United States
SO American Journal of Surgical Pathology, (1995) 19/8 (873-886). ISSN: 0147-5185 CODEN: AJSPDX
CY United States
DT Journal; Article
FS 005 General Pathology and Pathological Anatomy
016 Cancer
028 Urology and Nephrology
LA English
SL English

L7 ANSWER 28 OF 42 BIOSIS COPYRIGHT 2002 BIOLOGICAL ABSTRACTS INC.
AN 2002:97861 BIOSIS
DN PREV200200097861
TI IGF-1 induces **Pin1** expression in promoting cell cycle S-phase entry.
AU You, Han; Zheng, Hongwu; Murray, Steven A.; Yu, Qiang; Uchida, Takafumi; Fan, Daiming; Xiao, Zhi-Xiong Jim (1)
CS (1) Boston University School of Medicine, 88 East Newton Street, Evans 605, Boston, MA, 02118: jxiao@bu.edu USA
SO Journal of Cellular Biochemistry, (2001) Vol. 84, No. 2, pp. 211-216. print.
ISSN: 0730-2312.
DT Article
LA English

L7 ANSWER 29 OF 42 BIOSIS COPYRIGHT 2002 BIOLOGICAL ABSTRACTS INC.
AN 2002:76624 BIOSIS
DN PREV200200076624
TI Microtubule-targeting drugs induce Bcl-2 phosphorylation and association with **Pin1**.
AU Pathan, Nuzhat; Aime-Sempe, Christine; Kitada, Shinichi; Basu, Aruna; Haldar, Subrata; Reed, John C. (1)
CS (1) The Burnham Institute, 10901 N. Torrey Pines Rd, La Jolla, CA, 92037: jreed@burnham.org USA
SO Neoplasia (New York), (November December, 2001) Vol. 3, No. 6, pp. 550-559. print.
ISSN: 1522-8002.
DT Article
LA English

L7 ANSWER 30 OF 42 BIOSIS COPYRIGHT 2002 BIOLOGICAL ABSTRACTS INC.
AN 2001:492188 BIOSIS
DN PREV200100492188
TI **Pin1** regulates turnover and subcellular localization of beta-catenin by inhibiting its interaction with APC.
AU Ryo, Akihide; Nakamura, Masafumi; Wulf, Gerburg; Liou, Yih-Cherng; Lu, Kun Ping (1)
CS (1) Beth Israel Deaconess Medical Center, Boston, MA: klu@bidmc.harvard.edu USA
SO Nature Cell Biology, (September, 2001) Vol. 3, No. 9, pp. 793-801. print.
ISSN: 1465-7392.
DT Article
LA English
SL English

L7 ANSWER 31 OF 42 BIOSIS COPYRIGHT 2002 BIOLOGICAL ABSTRACTS INC.
AN 2001:453003 BIOSIS
DN PREV200100453003
TI Finding of inhibitors for prolyl isomerase Par14 essential for cell proliferation.
AU Uchida, Takafumi (1); Ikeda, Hirofumi; Miyashita, Hitoshi; Takebayashi, Yuji; Yoshida, Ayumi; Fujioka, Toru; Fukumoto, Manabu; Uchida, Chiyoko; Fujimori, Fumihiro
CS (1) Ibaraki University, Mito Japan
SO Proceedings of the American Association for Cancer Research Annual Meeting, (March, 2001) Vol. 42, pp. 481. print.
Meeting Info.: 92nd Annual Meeting of the American Association for Cancer Research New Orleans, LA, USA March 24-28, 2001
ISSN: 0197-016X.
DT Conference
LA English
SL English

L7 ANSWER 32 OF 42 BIOSIS COPYRIGHT 2002 BIOLOGICAL ABSTRACTS INC.
AN 2001:384056 BIOSIS
DN PREV200100384056
TI **Pin1** is overexpressed in breast **cancer** and cooperates with Ras signaling in increasing the transcriptional activity of c-Jun towards cyclin D1.
AU Wulf, Gerburg M.; Ryo, Akihide; Wulf, Gerald G.; Lee, Sam W.; Niu, Tianhua; Petkova, Victoria; Lu, Kun Ping (1)
CS (1) Cancer Biology Program, Division of Hematology and Oncology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, 02115: klu@caregroup.harvard.edu USA
SO EMBO (European Molecular Biology Organization) Journal, (July 2, 2001) Vol. 20, No. 13, pp. 3459-3472. print.
ISSN: 0261-4189.
DT Article
LA English
SL English

L7 ANSWER 33 OF 42 BIOSIS COPYRIGHT 2002 BIOLOGICAL ABSTRACTS INC.
AN 2001:217728 BIOSIS
DN PREV200100217728
TI Microtubule-targeting drugs induce Bcl-2 phosphorylation and association with **Pin1**.
AU Pathan, Nuzhat; Aime-sempe, Christine; Kitada, Shinichi; Haldar, Subrata; Reed, John C. (1)
CS (1) Burnham Institute, 10901 N. Torrey Pines, La Jolla, CA, 92037: jreed@burnham.org USA
SO Neoplasia (New York), (January February, 2001) Vol. 3, No. 1, pp. 70-79. print.
ISSN: 1522-8002.
DT Article
LA English
SL English

L7 ANSWER 34 OF 42 BIOSIS COPYRIGHT 2002 BIOLOGICAL ABSTRACTS INC.
AN 2000:396579 BIOSIS
DN PREV200000396579
TI Phosphorylation-dependent proline isomerization catalyzed by **Pin1** is essential for tumor cell survival and entry into mitosis.
AU Rippmann, Joerg F.; Hobbie, Silke; Daiber, Christine; Guilliard, Bernd; Bauer, Margit; Birk, Joachim; Nar, Herbert; Garin-Chesa, Pilar; Rettig, Wolfgang J.; Schnapp, Andreas (1)
CS (1) Department of Oncology Research, Boehringer Ingelheim Pharma KG, Birkendorfer Strasse 65, 88397, Biberach an der Riss Germany
SO Cell Growth & Differentiation, (July, 2000) Vol. 11, No. 7, pp. 409-416. print.
ISSN: 1044-9523.
DT Article
LA English
SL English

L7 ANSWER 35 OF 42 BIOSIS COPYRIGHT 2002 BIOLOGICAL ABSTRACTS INC.

AN 1998:73454 BIOSIS
DN PREV199800073454
TI Characterization and cell cycle regulation of the related human telomeric proteins Pin2 an TRF1 suggest a role in mitosis.
AU Shen, Minhui; Haggblom, Candy; Vogt, Marguerite; Hunter, Tony; Ping-Lu, Kun
CS Harvard Inst. Med., 330 Brookline Ave., HIM 1047, Boston, MA 02215 USA
SO Proceedings of the National Academy of Sciences of the United States of America, (Dec. 9, 1997) Vol. 94, No. 25, pp. 13618-13623. ISSN: 0027-8424.
DT Article
LA English

L7 ANSWER 36 OF 42 USPATFULL
AN 2002:43155 USPATFULL
TI **Pin1** as a marker for abnormal cell growth
IN Lu, Kun Ping, Newton, MA, UNITED STATES
Wulf, Gerburg, Cambridge, MA, UNITED STATES
Zhou, Xiao Zhen, Newton, MA, UNITED STATES
PI US 2002025521 A1 20020228
AI US 2000-726464 A1 20001129 (9)
PRAI US 1999-167800P 19991129 (60)
DT Utility
FS APPLICATION
LN.CNT 2873
INCL INCLM: 435/006.000
INCLS: 435/007.230
NCL NCLM: 435/006.000
NCLS: 435/007.230
IC [7]
ICM: C12Q001-68
ICS: G01N033-574
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 37 OF 42 USPATFULL
AN 2001:231143 USPATFULL
TI Arrays for identifying agents which mimic or inhibit the activity of interferons
IN Silverman, Robert H., Beachwood, OH, United States
Williams, Bryan R. G., Cleveland, OH, United States
Der, Sandy, Cleveland, OH, United States
PA The Cleveland Clinic Foundation, Cleveland, OH, United States (U.S. corporation)
PI US 6331396 B1 20011218
AI US 1999-405438 19990923 (9)
PRAI US 1998-101497P 19980923 (60)
DT Utility
FS GRANTED
LN.CNT 9639
INCL INCLM: 435/006.000
INCLS: 435/287.200; 536/023.100; 536/023.520; 536/024.300; 536/024.310
NCL NCLM: 435/006.000
NCLS: 435/287.200; 536/023.100; 536/023.520; 536/024.300; 536/024.310
IC [7]
ICM: C12Q001-68
ICS: C12M001-36; C07H021-04
EXF 435/6; 435/287.2; 536/23.1; 536/24.31; 536/23.52
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 38 OF 42 USPATFULL
AN 2001:182311 USPATFULL
TI Methods for the detection of modified peptides, proteins and other molecules
IN Volinia, Stefano, Ferrara, Italy
PI US 2001031469 A1 20011018
AI US 2001-753114 A1 20010102 (9)
PRAI US 2000-174171P 20000103 (60)
DT Utility
FS APPLICATION
LN.CNT 1431
INCL INCLM: 435/006.000
INCLS: 435/007.100
NCL NCLM: 435/006.000
NCLS: 435/007.100
IC [7]
ICM: C12Q001-68
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 39 OF 42 USPATFULL
AN 2001:139304 USPATFULL
TI PEDTIDYL-PROLYL CIS-TRANS ISOMERASE INHIBITORS AND USES THEREFORE
IN NOEL, JOSEPH P., SAN DIEGO, CA, United States
HUNTER, TONY R., DEL MAR, CA, United States
PI US 2001016346 A1 20010823
AI US 1998-94436 A1 19980609 (9)
DT Utility
FS APPLICATION
LN.CNT 1008
INCL INCLM: 435/233.000
INCLS: 514/019.000
NCL NCLM: 435/233.000
NCLS: 514/019.000
IC [7]
ICM: A61K038-00
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 40 OF 42 USPATFULL
AN 2000:31238 USPATFULL
TI Human parvulin-like protein
IN Au-Young, Janice, Berkeley, CA, United States
PA Incyte Pharmaceuticals, Inc., Palo Alto, CA, United States (U.S. corporation)
PI US 6037164 20000314
AI US 1997-801743 19970214 (8)
DT Utility
FS Granted
LN.CNT 2013
INCL INCLM: 435/233.000
INCLS: 435/252.300; 435/320.100; 536/023.200; 536/023.500
NCL NCLM: 435/233.000
NCLS: 435/252.300; 435/320.100; 536/023.200; 536/023.500
IC [7]
ICM: C12N009-90
ICS: C12N001-21; C12N015-63; C07H021-04
EXF 435/233; 435/252.3; 435/320.1; 536/23.2; 536/23.5
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 41 OF 42 USPATFULL
AN 1999:132586 USPATFULL
TI NIMA interacting proteins
IN Hunter, Tony, Del Mar, CA, United States
Lu, Kun Ping, San Diego, CA, United States
PA The Salk Institute for Biological Studies, San Diego, CA, United States (U.S. corporation)
PI US 5972697 19991026
AI US 1995-555912 19951113 (8)
DT Utility
FS Granted

LN.CNT 1795
INCL INCLM: 435/320.100
INCLS: 435/252.300; 536/023.100; 530/350.000
NCL NCLM: 435/320.100
NCLS: 435/252.300; 530/350.000; 536/023.100
IC [6]
ICM: C12N015-00
EXF 536/23.1; 530/350; 435/252.3; 435/320.1
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

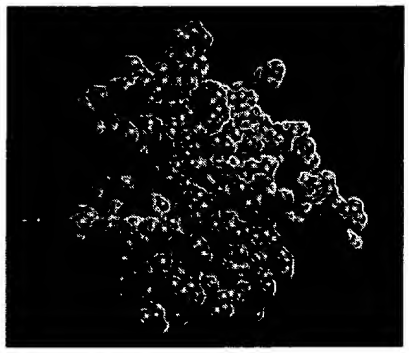
L7 ANSWER 42 OF 42 USPATFULL
AN 1999:110456 USPATFULL
TI NIMA interacting proteins
IN Hunter, Tony, Del Mar, CA, United States
Lu, Kun Ping, San Diego, CA, United States
PA The Salk Institute for Biological Studies, La Jolla, CA, United States
(U.S. corporation)
PI US 5952467 19990914
AI US 1998-66074 19980424 (9)
RLI Division of Ser. No. US 1995-555912, filed on 13 Nov 1995
DT Utility
FS Granted
LN.CNT 1777
INCL INCLM: 530/350.000
INCLS: 530/324.000
NCL NCLM: 530/350.000
NCLS: 530/324.000
IC [6]
ICM: C07K014-00
EXF 530/350; 530/324
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

CELL BIOLOGY:

Pinning Down Cell Division

Gretchen Vogel

The events in the cell just before it divides are some of the most dramatic in biology. The chromosomes condense, the nuclear membrane disappears, and the cell starts to build its mitotic spindle--a set of fibers that will eventually pull the chromosomes to the opposite poles of the dividing cell. How the cell choreographs these complex changes is unclear, but on page 1957, molecular biologist Kun Ping Lu of Beth Israel Deaconess Medical Center in Boston and Harvard University and his colleagues report evidence for a new mechanism that may play a key role.



Twister. The Pin1 protein may help regulate mitosis by binding to phosphorylated proteins. The bright green region at left is the phosphate binding site.

LU *ET AL.*

Cell biologists have long known that the cell's progress toward division is controlled by a group of kinases, enzymes that add phosphate groups to a variety of cell proteins. For the most part, though, they've had few clues to what those phosphate additions actually do. That's where the Lu team's work comes in. It suggests that the phosphates serve as a sort of tag for attracting an enzyme called Pin1, which may cause the phosphorylated proteins to change their shapes. Researchers don't yet know exactly what this accomplishes, although they point to several possibilities, such as turning off an active enzyme, directing a protein to a new place in the cell, or targeting a protein for degradation. Whatever the precise result, however, the work provides "a new function for phosphorylation," says molecular biologist Tony Hunter of the Salk Institute in La Jolla, California.

Lu and Hunter first discovered Pin1 2 years ago as a protein that interacts with and inhibits another critical cell regulator, called NIMA, which helps turn on mitosis. Pin1 itself is an isomerase enzyme that changes the configuration of the peptide bond preceding proline, an amino acid that is an important determinant of protein structure because it can put kinks into a protein chain. Previous studies also showed that Pin1 is crucial for both yeast and human cells to divide properly. Without it, for example, cells can't complete mitosis. But its precise role in the cell remained a mystery.

Researchers got a clue earlier this year, however, when Joseph Noel of the Salk Institute solved Pin1's three-dimensional structure. It showed that the enzyme has a pocket for binding phosphate next to the site where it binds its proline target, says molecular biologist Lewis Cantley of Harvard, a co-author on the *Science* paper. That suggested Pin1 might bind phosphorylated proteins.

To confirm that hunch, the team searched through a library of protein fragments for peptides that bind to the enzyme. Sure enough, says Cantley, Pin1 preferentially picked out peptides that have a phosphate attached to an amino acid adjacent to a proline. With some sequences, in fact, the phosphorylated version bound thousands of times better than the unphosphorylated peptide.

Other unpublished work suggests that Pin1 might help orchestrate cell division by interacting with other proteins involved in mitosis. When members of Lu's team went "fishing" through the contents of ruptured cells for proteins that bind to Pin1, they landed at least a dozen that are also targeted by an antibody, called MPM-2, that binds to proteins involved in mitosis in a wide range of cells. These proteins, too, contain a proline and an adjacent phosphate.

Taken together, say Lu and his colleagues, the experiments suggest that Pin1 helps regulate a two-step process that governs cell division. Adding phosphates to proteins involved in mitosis creates binding sites for Pin1, which can then latch onto them and twist the peptide bond next to the prolines it contacts. That might, in turn, change the shape of the whole protein, perhaps altering its ability to interact with still other proteins, its location in the cell, or its life-span.

Whatever the binding does, Cantley suggests that it might enable Pin1 to serve as a sort of checkpoint on the way to cell division. He notes that while cells lacking the protein can't divide--indeed, they die instead--manipulations that increase Pin1 production delay the onset of mitosis. Based on that, he proposes that by binding to phosphorylated proteins, Pin1 may slow down the activity of any proteins that are getting ahead of the rest of the cell. Hunter agrees. The properties of the protein suggest it might work as "some sort of threshold device," he says, preventing premature functioning of certain proteins. If so, cells lacking the protein may die, because events get so out of order that they go into mitotic arrest.

Other researchers aren't convinced that the story is that straightforward, however. Cancer pharmacologists Sally Kornbluth and Tony Means of Duke University have evidence that Pin1 can bind to NIMA without the help of phosphate, and that it binds to other proteins that do not bind MPM-2. "The mechanisms that govern the effects of Pin1 in the cell ... have yet to be defined," Means says.

Indeed, Cantley cautions that no one has yet pinned down exactly what the protein does when it binds: "We have no proof that isomerization is what's required for physiological function." It is possible, he says, that simply binding to a protein is enough to slow it down. Because researchers can now identify Pin1's partners, they hope they will soon be able to sort out its role.

But even before that happens, the protein is attracting drug companies' interest. Because blocking the enzyme kills cells as they attempt to divide, drugs that inhibit the enzyme should target fast-dividing

cancer cells without affecting the majority of cells in the body that divide only occasionally. "At least three or four companies are interested in looking for inhibitors," Lu says.

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Volume 278, Number 5345, Issue of 12 Dec 1997, pp. 1883-1884.

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